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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/006,533

12/05/2001

Pavel G. Polynkin

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01/30/2003

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EXAMINER

GEISEL, KARA E

ART UNIT

PAPER NUMBER

2877

DATE MAILED: 01/30/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Applicati n No.

10/006,533

Applicant(s)

POLYNKIN ET AL.

Examiner

Kara E Geisel

Art Unit

2877

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☐ Responsive to communication(s) filed on \_\_\_\_\_.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-51 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 23-46 is/are allowed.
- 6) ☒ Claim(s) 1-6, 10-13, 18-20 and 47-51 is/are rejected.
- 7) ☒ Claim(s) 7-9, 14-17 and 21-22 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 05 December 2001 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

**Priority under 35 U.S.C. §§ 119 and 120**

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 2.
- 4) ☐ Interview Summary (PTO-413) Paper No(s) \_\_\_\_\_.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other:

Art Unit: 2877

## DETAILED ACTION

### *Information Disclosure Statement*

The information disclosure statement filed on December 5<sup>th</sup>, 2001 has been fully considered by the examiner.

### *Specification*

The lengthy specification has not been checked to the extent necessary to determine the presence of all possible minor errors. Applicant's cooperation is requested in correcting any errors of which applicant may become aware in the specification.

### *Claim Rejections - 35 USC § 112*

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter, which the applicant regards as his invention.

Claims 13 and 18-20 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claims 13 and 18 recite the limitation "said beam-modulating elements" bridging lines 2 and 3 of both. There is insufficient antecedent basis for this limitation in the claims.

Claims, which are dependent from claims 13 and 18 inherit the problems of these claims, and are, therefore also rejected under 35 U.S.C. 112, second paragraph.

### *Claim Rejections - 35 USC § 103*

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the

Art Unit: 2877

time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claims 1-4, 12, and 47-51 are rejected under 35 U.S.C. 103(a) as being unpatentable over Fateley (USPN 6,128,078).

In regards to claims 1 and 47, Fateley discloses an optical apparatus comprising an input port (fig. 1, 30) providing a multi-wavelength optical signal (fig. 1, 12), a wavelength disperser (fig. 1, 16) which separates the signal into multiple spectral channels having a predetermined relative arrangement (column 3, lines 44-50), and an array of micromirrors (fig. 1, 18) positioned such that each mirror receives one of the spectral channels (column 3, lines 51-54), the micromirrors being individually pivotable such that optical power levels of the spectral channels coupled into said output port carry distinct dither modulation signals (columns 3-4, lines 65-67 and 1-31, respectively). The output port is obviously the image plane of the detector.

In regards to claim 2, an optical apparatus is disclosed above. Furthermore, the apparatus also comprises an optical detector (fig. 1, 20), optically coupled to the output port, wherein said optical detector converts the optical power levels into an electrical signal (column 4, lines 25-27).

In regards to claims 3 and 48-49, an optical apparatus with a detector is disclosed above. Furthermore, the apparatus also comprises a synchronous detection unit (fig. 1, 22), in communication with the optical detector, wherein the detection unit detects from the electrical signal the dither modulation signal in the optical power levels (column 4, lines 33-45).

In regards to claims 4 and 50, an optical apparatus with a detector and a synchronous detection unit is disclosed above. Furthermore, the apparatus also comprises a signal processor (fig. 1, 22), containing a predetermined calibration table (column 4, lines 15-20), the signal processor deriving an optical power spectrum of said multi-wavelength optical signal from said dither modulation signals (column 4, lines 32-52).

Art Unit: 2877

In regards to claim 12, an optical apparatus is disclosed above. Furthermore, the wavelength disperser can be a curved diffraction grating or a dispersing prism (column 3, lines 44-50).

In regards to claim 51, a method of spectral monitoring and modulating is disclosed above. Furthermore, the micromirrors are individually pivoted about respective nominal position (columns 3-4, lines 65-67 and 1-6, respectively) by way of a set of mirror control signals (column 4, lines 3-5), thereby producing said dither modulation signals in the optical power levels.

Claims 5, 6, and 10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Fateley (USPN 6,128,078) in view of Sweatt et al. (USPN 6,504,943).

In regards to claim 5, an optical apparatus is disclosed above. Fateley does not disclose that the detector is a photodiode, however, it is well known in the art to use photodiodes to measure optical power levels. For example, Sweatt discloses a spectral imaging device comprising an input port, a wavelength disperser, a micromirror array, and two photodiodes (fig. 4a, 408 and 409) to detect the optical power levels of spectral channels from a light source after it has been dispersed and modulated. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to use photodiodes as the detector in Fateley's optical apparatus.

In regards to claim 6, an optical apparatus is disclosed above. Fateley discloses that the micromirrors are pivoted about respective nominal positions (column 3-4, lines 65-67 and 1-6, respectively) by way of a set of mirror control signals (column 4, lines 3-5), thereby producing said dither modulation signals in the optical power levels. Fateley does not disclose that the output port comprises a spatial filter.

Sweatt discloses an optical apparatus comprising a multi-wavelength light source, an input port (fig. 4a, 14), a wavelength disperser (fig. 4a, 18), an array of micromirrors (fig. 4a, 402), and an output port, which comprises a spatial filter. The spatial filter is used so that only the modulated light from the micromirrors can reach the output port (column 9, lines 39-44). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to add Sweatt's spatial filter to Fateley's optical apparatus by the exit port so that only the light modulated by the micromirrors could enter the exit port.

Art Unit: 2877

In regards to claim 10, an optical apparatus with a spatial filter is disclosed above. Furthermore, the spatial filter of the combined system is an aperture (Sweatt column 9, lines 39-41).

Claim 11 is rejected under 35 U.S.C. 103(a) as being unpatentable over Fateley (USPN 6,128,078) in view of Hornbeck (USPN 5,061,049).

In regards to claim 11, an optical apparatus is disclosed above. Furthermore, Fateley discloses a preferred embodiment of the micromirror array that can be used in the apparatus is disclosed by Hornbeck (column 3, lines 54-60). Hornbeck discloses that the micromirrors comprise silicon micromachined mirrors (Hornbeck column 9, lines 15-36).

*Allowable Subject Matter*

Claims 23-46 are allowed.

Claims 7-9, 14-17, and 21-22 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Claims 13 and 18 would be allowable if rewritten to overcome the rejection(s) under 35 U.S.C. 112, second paragraph, set forth in this Office action and to include all of the limitations of the base claim and any intervening claims.

The following is a statement of reasons for the indication of allowable subject matter:

As to claim 7, the prior art of record, taken alone or in combination, fails to disclose or render obvious an optical apparatus comprising an input port providing a multi-wavelength optical signal, an output port, a wavelength disperser for separating the signal into spectral channels, and an array of micromirrors that each receive a unique channel, each mirror pivotable such that optical power levels of channels coupled into the output port carry distinct dither modulation signals, wherein said output port comprises a spatial filter, and wherein said optical power levels coupled into the filter are at maximum values when micromirrors are at a nominal position.

Art Unit: 2877

As to claim 8, the prior art of record, taken alone or in combination, fails to disclose or render obvious an optical apparatus comprising an input port providing a multi-wavelength optical signal, an output port, a wavelength disperser for separating the signal into spectral channels, and an array of micromirrors that each receive a unique channel, each mirror pivotable such that optical power levels of channels coupled into the output port carry distinct dither modulation signals, wherein said output port comprises a spatial filter, wherein a set of mirror control signals that pivot the mirrors include dither components, which are mutually orthogonal functions of time.

As to claim 9, the prior art of record, taken alone or in combination, fails to disclose or render obvious an optical apparatus comprising an input port providing a multi-wavelength optical signal, an output port, a wavelength disperser for separating the signal into spectral channels, and an array of micromirrors that each receive a unique channel, each mirror pivotable such that optical power levels of channels coupled into the output port carry distinct dither modulation signals, wherein said output port comprises a spatial filter, wherein a set of mirror control signals that pivot the mirrors include dither components, classified in a plurality of distinct dither groups, wherein each dither group contains dither components that are mutually orthogonal functions of time, and wherein the optical apparatus further comprises one or more auxiliary spatial filters, such that the spectral channels coupled into each filter carry distinct dither modulation signals.

As to claim 13, the prior art of record, taken alone or in combination, fails to disclose or render obvious an optical apparatus comprising an input port providing a multi-wavelength optical signal, an output port, a wavelength disperser for separating the signal into spectral channels, and an array of micromirrors that each receive a unique channel, each mirror pivotable such that optical power levels of channels coupled into the output port carry distinct dither modulation signals, and further comprising a beam focuser for focusing the spectral channels into corresponding focused spots that impinge onto the elements of the micromirror.

As to claim 14, the prior art of record, taken alone or in combination, fails to disclose or render obvious an optical apparatus comprising an input port providing a multi-wavelength optical signal, an output port, a wavelength disperser for separating the signal into spectral channels, and an array of micromirrors that each

Art Unit: 2877

receive a unique channel, each mirror pivotable such that optical power levels of channels coupled into the output port carry distinct dither modulation signals, and further comprising a reference signal, emerging from the input port along with the multi-wavelength signal, wherein the wavelength disperser directs a reference spectral component of the reference signal to a predetermined location on a reference position sensing element.

As to claim 21, the prior art of record, taken alone or in combination, fails to disclose or render obvious an optical apparatus comprising an input port providing a multi-wavelength optical signal, an output port, a wavelength disperser for separating the signal into spectral channels, and an array of micromirrors that each receive a unique channel, each mirror pivotable such that optical power levels of channels coupled into the output port carry distinct dither modulation signals, wherein the input port comprises a fiber collimator.

As to claim 23, the prior art of record, taken alone or in combination, fails to disclose or render obvious an optical apparatus comprising an input port that provides a multi-wavelength optical signal, first and second output ports, a polarization separating element that decomposes signal into first and second polarization components, a polarization rotating element for rotating the polarization of the second component by 90 degrees, a wavelength disperser to separate components into first and second optical beams, a beam focuser that focuses the beams into corresponding focused spots, and an array of beam-modulating elements to direct the beams into the output ports, the beam-modulating elements individually controllable such that optical power levels of the beams coupled into the output ports carry distinct dither modulation signals.

As to claim 40, the prior art of record, taken alone or in combination, fails to disclose or render obvious an optical apparatus comprising an input port that provides a multi-wavelength optical signal, a polarization separating element that decomposes signal into first and second polarization components, a polarization rotating element for rotating the polarization of the second component by 90 degrees, a wavelength disperser to separate components into first and second optical beams, a beam focuser that focuses the beams into corresponding focused spots, and an array of spatial light modulators to direct the beams into first and second detectors, the beam-modulating elements individually controllable such that optical power levels of the beams coupled into the detectors carry distinct dither modulation signals.



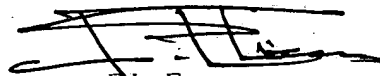
Art Unit: 2877

*Conclusion*

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Kara E Geisel whose telephone number is 703 305 7182. The examiner can normally be reached on Monday through Thursday, 8am to 5pm and every other Friday 8am to 5pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Frank Font can be reached on 703 308 4881. The fax phone numbers for the organization where this application or proceeding is assigned are 703 872 9318 for regular communications and 703 872 9319 for After Final communications. For inquiries of a general nature, the Customer Service fax number is 703 872 9317.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703 308 1782.



F.L. Evans  
Primary Examiner  
Art Unit 2877

K.G.

KEG

January 27, 2003